Speeding up Children Reunification in Disaster Scenarios via Serverless Computing

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Missing People After Natural Disasters

- 5192 Gulf Coast children missing after Hurricanes Katrina
- Federal government received 34,000 calls
- 6 months to reunite all of the children
- Many homeless, mentally disabled, and mentally ill adults missing after Hurricane Harvey
Overview

- Reunification requires identifying information about individuals
- Often, victims can not self identify
- Serverless database queries and face recognition for identification
Architecture

Upload-Flask-OpenWhisk-Match

Step 1: Parent uploads recent portrait of child to DB
Step 2: First-responder uploads image(s) of lost child(ren) to Flask server
Step 3: Flask server queues images and sends them to OpenWhisk
Step 4: OpenWhisk does face recognition processing and DB queries for information. Information is sent back to first-responder via Flask
Upload

- Relatives upload information about missing child
  - Photo
  - Identifying features and information
  - Relative’s contact Information

Step 1: Parent uploads recent portrait of child to DB
Flask

- First responders upload photo of victim
  - Can provide info on identifying features
- Flask queues and sorts images by unique IP of uploader
OpenWhisk

- Face Recognition and text-based DB queries
- Narrow search space by using any identifying information before face recognition
- Returns the contact information uploaded by the parent when a match is found

Step 4: OpenWhisk does face recognition processing and DB queries for information. Information is sent back to first-responder via Flask
Why Serverless?

- Bursty computation
- Modular
- Implementation in an ad-hoc edge network
- Fast, scalable and federated profile matching
- OpenWhisk actions defined by machine learning (classification) operations